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17. INTAKE OF GRAIN PRODUCTS

Consumption of grain products is a potential pathway of exposure to toxic chemicals. These food sources can become contaminated by absorption or deposition of ambient air pollutants onto the plants, contact with chemicals dissolved in rainfall or irrigation waters, or absorption of chemicals through plant roots from soil and ground water. The addition of pesticides, soil additives, and fertilizers may also result in contamination of grain products.

The U.S. Department of Agriculture's (USDA) Nationwide Food Consumption Survey (NFCS) and Continuing Survey of Food Intakes by Individuals (CSFII) are the primary sources of information of intake rates of grain products in the United States. Data from the NFCS have been used in various studies to generate consumeronly and per capita intake rates for both individual grain products and total grains. CSFII 1989-1991 survey data have been analyzed by EPA to generate per capita intake rates for various food items and food groups. As described in Volume II, Chapter 9, consumer-only intake is defined as the quantity of grain products consumed by individuals who ate these food items during the survey period. Per capita intake rates are generated by averaging consumer-only intakes over the entire population of users and non-users. In general, per capita intake rates are appropriate for use in exposure assessments for which average dose estimates for the general population are of interest because they represent both individuals who ate the foods during the survey period and individuals who may eat the food items at some time, but did not consume them during the survey period.

This Chapter provides intake data for individual grain products and total grains. Recommendations are based on average and upper-percentile intake among the general population of the U.S. Available data have been classified as being either a key or a relevant study based on the considerations discussed in Volume I, Section 1.3.1 of the Introduction. Recommendations are based on data from the CSFII survey, which was considered the only key intake study for grain products. Although Pao et al. (1982) was not considered a key study for intake of grain products because it is based on data from NFCS 1977-1978, it was included as a key study for serving size. Other relevant studies are also presented to provide the reader with added perspective on this topic. It should be noted that most of the key and relevant studies presented in this Chapter are based on data from USDA's NFCS and CSFII. The USDA NFCS and CSFII are described below.

17.1. INTAKE STUDIES

17.1.1. U.S. Department of Agriculture Nationwide Food Consumption Survey and Continuing Survey of Food Intake by Individuals

The NFCS and CSFII are the basis of much of the data on grain intake presented in this section. Data from the 1977-78 NFCS are presented because the data have been published by USDA in various reports and reanalyzed by various EPA offices according to the food items/groups commonly used to assess exposure. Published one-day data from the 1987-88 NFCS are also presented. Recently, EPA conducted an analysis of USDA's 1989/91 CSFII. These data are the most recent food survey data that are available to the public. The results of EPA's analyses are presented here. Detailed descriptions of the NFCS and CSFII data are presented in Volume II, Chapter 9 - Intake of Fruits and Vegetables.

Individual average daily intake rates calculated from NFCS data are based on averages of reported individual intakes over one day or three consecutive days. Such short term data are suitable for estimating average daily intake rates representative of both short-term and long-term consumption. However, the distribution of average daily intake rates generated using short term data (e.g., 3-day) do not necessarily reflect the long-term distribution of average daily intake rates. The distributions generated from short term and long term data will differ to the extent that each individual's intake varies from day to day; the distributions will be similar to the extent that individuals' intakes are constant from day to day.

Day-to-day variation in intake among individuals will be great for food item/groups that are highly seasonal and for items/groups that are eaten year around, but that are not typically eaten every day. For these foods, the intake distribution generated from short term data will not be a good reflection of the long term distribution. On the other hand, for broad categories of foods (e.g., total grains) which are eaten on a daily basis throughout the year with minimal seasonality, the short term distribution may be a reasonable approximation of the true long term distribution, although it will show somewhat more variability. In this Chapter, distributions are shown for the various grain categories. Because of the increased variability of the short-term distribution, the short-term upper percentiles shown will overestimate somewhat the corresponding percentiles of the long-term distribution.



17.1.2. Key Grain Products Intake Studies Based on the CSFII

U.S. EPA Analysis of 1989/91 USDA CSFII Data -EPA conducted an analysis of USDA's 1989-91 CSFII data set. The general methodology used in analyzing the data is presented in Volume II, Chapter 9 (Fruits and Vegetables) of this handbook. Intake rates were generated for the following grain products: total grains, breads, sweets, snacks, breakfast foods, pasta, cooked cereals, rice, ready-to-eat cereals, and baby cereals. Appendix 17A provides the food codes and descriptions used in this grain analysis. The data for total grains have been corrected to account for mixtures as described in Volume II, Chapter 9 and Appendix 9A using an assumed grain content of 31 percent for grain mixtures and 13 percent for meat mixtures. Per capita intake rates for total grains are presented in Tables 17-1. Table 17-2 through 17-10 present per capita intake data for individual grain products. The results are presented in units of g/kg-day. Thus, use of these data in calculating potential dose does not require the body weight factor to be included in the denominator of the average daily dose (ADD) equation. It should be noted that converting these intake rates into units of g/day by multiplying by a single average body weight is inappropriate, because individual intake rates were indexed to the actual body weights of the survey respondents. However, if there is a need to compare the total intake data presented here to other intake data in units of g/day, a body weight less than 70 kg (i.e., approximately 60 kg; calculated based on the number of respondents in each age category and the average body weights for these age groups, as presented in Volume I, Chapter 7) should be used because the total survey population included children as well as adults.

The advantages of using the CSFII data set are that the data are expected to be representative of the U.S. population and that it includes data on a wide variety of food types. The data set is the most recent of a series of publicly available data sets (i.e., NFCS 1977/78; NFCS 1987/88; CSFII 1989-91) from USDA, and should reflect current eating patterns in the United States. The data set includes three years of intake data combined. However, the CSFII data are based on a three day survey period. Short-term dietary data may not accurately reflect longterm eating patterns. This is particularly true for the tails of the distribution of food intake. In addition, the adjustment for including mixtures adds uncertainty to the intake rate distributions. The calculation for including mixtures assumes that intake of any mixture includes grains in the proportions specified in Appendix Table 9A-

1. This assumption yields valid estimates of per capita consumption, but results in overestimates of the proportion of the population consuming total grains; thus, the quantities reported in Table 17-1 should be interpreted as upper bounds on the proportion of the population consuming grain products, not as valid point estimates.

17.1.3. Key Grain Products Serving Size Study Based on the USDA NFCS

Pao et al. (1982) - Foods Commonly Eaten by Individuals - Using data gathered in the 1977-78 USDA NFCS, Pao et al. (1982) calculated percentiles for the quantities of grain products consumed per eating occasion by members of the U.S. population. The data were collected during NFCS home interviews of 37,874 respondents, who were asked to recall food intake for the day preceding the interview, and record food intake the day of the interview and the day after the interview. Quantities consumed per eating occasion, are presented in Table 17-11.

The advantages of using these data are that they were derived from the USDA NFCS and are representative of the U.S. population. This data set provides distributions of serving sizes for a number of commonly eaten grain products, but the list of foods is limited and does not account for grain products included in complex food dishes. Also, these data are based on short-term dietary recall and may not accurately reflect long-term consumption patterns. Although these data are based on the NFCS 1977-78 survey, serving size data have been collected, but not published, for the more recent USDA surveys.

17.1.4. Relevant Grain Products Intake Studies

The U.S. EPA's Dietary Risk Evaluation System (DRES) - USEPA, Office of Pesticide Programs (OPP) -EPA OPP's DRES contains per capita intake rate data for various grain products for 22 subgroups (age, regional, and seasonal) of the population. As described in Volume II, Chapter 9 - Fruits and Vegetables, intake data in DRES were generated by determining the composition of NFCS food items and disaggregating complex food dishes into their component raw agricultural commodities (RACs) (White et al., 1983). The DRES per capita, as consumed intake rates for all age/sex/demographic groups combined are presented in Table 17-12. These data are based on both consumers and non-consumers of these food items. Data for specific subgroups of the population are not presented in this section, but are available through OPP via direct request. The data in Table 17-12 may be



useful for estimating the risks of exposure associated with the consumption of the various grain products presented. It should be noted that these data are indexed to the actual body weights of the survey respondents and are expressed in units of grams of food consumed per kg body weight per day. Consequently, use of these data in calculating potential dose does not require the body weight factor in the denominator of the average daily dose (ADD) equation. It should also be noted that conversion of these intake rates into units of g/day by multiplying by a single average body weight is not appropriate because the DRES data base did not rely on a single body weight for all individuals. Instead, DRES used the body weights reported by each individual surveyed to estimate consumption in units of g/kg-day.

The advantages of using these data are that complex food dishes have been disaggregated to provide intake rates for a variety of grains. These data are also based on the individual body weights of the respondents. Therefore, the use of these data in calculating exposure to toxic chemicals may provide more representative estimates of potential dose per unit body weight. However, because the data are based on NFCS short-term dietary recall, the same limitations discussed previously for other NFCS data sets also apply here. In addition, consumption patterns may have changed since the data were collected in 1977-78. OPP is in the process of translating consumption information from the USDA CSFII 1989-91 survey to be used in DRES.

Food and Nutrient Intakes of Individuals in One Day in the U.S., USDA (1980, 1993a) -USDA (1980; 1993a) calculated mean per capita intake rates for total and individual grain products using NFCS data from 1977-78 and 1987-88. The mean intake rates for grain products are presented in Tables 17-13 and 17-14 for the two survey years, respectively.

The advantages of using these data are that they provide mean intake estimates for various grain products. The consumption estimates are based on short-term (i.e., 1-day) dietary data which may not reflect long-term consumption.

U.S. EPA - Office of Radiation Programs - The U.S. EPA Office of Radiation Programs (ORP) has also used the USDA 1977-1978 NFCS to estimate daily food intake. ORP uses food consumption data to assess human intake of radionuclides in foods (U.S. EPA, 1984a; 1984b). The 1977-1978 NFCS data have been reorganized by ORP, and food items have been classified according to the characteristics of radionuclide transport. The mean dietary per capita intake of grain products,

grouped by age, for the U.S. population are presented in Table 17-15. The mean daily intake rates of grain products for the U.S. population grouped by regions are presented in Table 17-16. Because this study was based on the USDA NFCS, the limitations and advantages associated with the USDA-NFCS data also apply to this data set.

U.S. EPA - Office of Science and Technology - The U.S. EPA Office of Science and Technology (OST) within the Office of Water (formerly the Office of Water Regulations and Standards) used data from the FDA revision of the Total Diet Study Food Lists and Diets (Pennington, 1983) to calculate food intake rates. OST uses these consumption data in its risk assessment model for land application of municipal sludge. The FDA data used are based on the combined results of the USDA 1977-1978 NFCS and the second National Health and Nutrition Examination Survey (NHANES II), 1976-1980 (U.S. EPA, 1989). Because food items are listed as prepared complex foods in the FDA Total Diet Study, each item was broken down into its component parts so that the amount of raw commodities consumed could be determined. Table 17-17 presents intake rates for grain products for various age groups. Estimated lifetime ingestion rates derived by U.S. EPA (1989) are also presented in Table 17-17. Note that these are per capita intake rates tabulated as grams dry weight/day. Therefore, these rates differ from those in the previous tables because USDA (1980; 1992) and U.S. EPA (1984a, 1984b) report intake rates on an as consumed basis.

The EPA-OST analysis provides intake rates for additional food categories and estimates of lifetime average daily intake on a per capita basis. In contrast to the other analyses of USDA NFCS data, this study reports the data in terms of dry weight intake rates. Thus, conversion is not required when contaminants are provided on a dry weight basis.

USDA (1993b) - Food Consumption, Prices, and Expenditures, 1970-92 - The USDA's Economic Research Service (ERS) calculates the amount of food available for human consumption in the United States annually. Supply and utilization balance sheets were generated. These were based on the flow of food items from production to end uses. Total available supply was estimated as the sum of production (i.e., some products were measured at the farm level or during processing), starting inventories, and imports (USDA, 1993). The availability of food for human use commonly termed as "food disappearance" was determined by subtracting



exported foods, products used in industries, farm inputs (seed and feed) and end-of-the year inventories from the total available supply (USDA, 1993). USDA (1993) calculated the per capita food consumption by dividing the total food disappearance by the total U.S. population.

USDA (1993) estimated per capita consumption data for grain products from 1970-1992 (1992 data are preliminary). In this section, the 1991 values, which are the most recent final data, are presented. Table 17-18 presents per capita consumption in 1991 for grains.

One of the limitations of this study is that disappearance data do not account for losses from the food supply from waste, spoilage, or foods fed to pets. Thus, intake rates based on these data may overestimate daily consumption because they are based on the total quantity of marketable commodity utilized. Therefore, these data may be useful for estimating bounding exposure estimates. It should also be noted that per capita estimates based on food disappearance are not a direct measure of actual consumption or quantity ingested, instead the data are used as indicators of changes in usage over time (USDA, 1993). An advantage of this study is that it provides per capita consumption rates for grains which are representative of long-term intake because disappearance data are generated annually. Daily per capita intake rates are generated by dividing annual consumption by 365 days/year.

17.2. RECOMMENDATIONS

The CSFII data described in this section was used in selecting recommended grain, product intake rates for the general population and various subgroups of the United States population. The general design of both key and relevant studies are summarized in Table 17-19. The recommended values for intake of grain products are summarized in Table 17-20 and the confidence ratings for the recommended values for grain intake rates are presented in Table 17-21. Per capita intake rates for specific grain items, on a g/kg-day basis, may be obtained from Tables 17-2 through 17-10. Percentiles of the intake rate distribution in the general population for total grains, are presented in Tables 17-1. From these tables, the mean and 95th percentile intake rates for grains are 4.1 g/kg-day and 10.8 g/kg-day, respectively. It is important to note that the distributions presented in Tables 17-1 through 17-10 are based on data collected over a 3-day period and may not necessarily reflect the long-term distribution of average daily intake rates. However, for the broad categories of foods (i.e., total grains, breads), because they may be eaten on a daily basis throughout the year

with minimal seasonality, the short-term distribution may be a reasonable approximation of the long-term distribution, although it will display somewhat increased variability. This implies that the upper percentiles shown will tend to overestimate the corresponding percentiles of the true long-term distribution.

This section also presents recommendations for serving size for various grains. These recommendations are based on the USDA NFCS 1977-78 data. The confidence rating for serving size recommendations are presented in Table 17-22. Percentiles of the serving size, as well as mean values, can be obtained from Table 17-11

The advantage of using the CSFII and USDA NFCS data set is they are the largest publicly available data source on food intake patterns in the United States. Data are available for a wide variety of grain products and are intended to be representative of the U.S. population.

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Population Group	Percent Consuming	MEAN	SE	P1	P5	P10	P25	P50	P75	P90	P95	P99	P100
Total	97.5%	4.061	0.033	0	0.74	1.16	1.90	3.06	4.96	8.04	10.77	18.53	42.98
Age													
< 01	80.4%	7.049	0.361	0	0	0	1.46	6.05	10.18	16.75	19.50	27.61	37.41
1-2	95.8%	10.567	0.285	0	2.86	4.34	6.55	9.59	14.06	18.92	21.57	28.22	42.98
3-5	97.5%	9.492	0.201	0	3.13	4.35	60.9	8.91	11.88	15.13	19.14	23.87	33.08
6-11	97.7%	6.422	0.117	0	2.14	2.88	4.07	5.70	7.82	10.26	12.85	21.40	31.93
12-19	98.2%	3.764	0.065	0	1.15	1.52	2.16	3.31	4.81	6.46	8.03	10.92	19.30
20-39	98.4%	3.095	0.035	0	0.70	1.08	1.75	2.73	4.00	5.47	6.55	9.57	25.71
40-69	98.3%	2.792	0.031	0	0.69	0.98	1.59	2.47	3.54	4.96	6.09	8.40	20.34
70 +	98.7%	3.263	0.066	0.38	0.89	1.24	1.86	2.72	4.04	5.81	7.63	10.47	21.45
Season													
Fall	92.9%	4.282	0.066	0	0.84	1.24	2.07	3.19	5.19	8.54	11.88	19.10	37.77
Spring	92.0%	3.983	0.071	0	0.70	1.10	1.79	2.95	4.73	7.78	10.52	23.87	31.93
Summer	97.5%	3.948	0.062	0	0.74	1.13	1.82	2.99	4.96	7.98	10.16	15.34	30.13
Winter	%9′.26	4.031	0.063	0	0.70	1.17	1.95	3.17	4.99	8.00	10.48	16.86	42.98
Urbanization													
Central City	%9′.26	4.159	0.061	0	0.75	1.13	1.91	3.06	5.07	8.71	11.61	17.69	37.77
Nonmetropolitan	%6.96	4.013	0.067	0	09.0	1.11	1.85	3.12	4.93	7.81	10.08	21.05	31.93
Suburban	94.8%	4.02	0.049	0	08.0	1.18	1.90	3.04	4.91	7.79	10.63	18.53	42.98
Race													
Asian	94.0%	6.479	0.402	0	0	1.46	3.02	5.44	9.07	14.13	14.63	20.65	23.78
Black	%6.96	4.372	0.103	0	0.55	0.94	1.81	3.05	5.69	9.47	12.47	18.96	40.07
Native American	87.7%	3.98	0.276	0	0	0.61	1.63	3.67	5.81	6.90	9.00	20.43	21.84
Other/NA	97.1%	4.561	0.208	0	0	1.21	2.26	3.56	5.36	8.87	11.72	22.07	30.51
White	94.9%	3.962	0.035	0	0.79	1.18	1.90	3.03	4.80	7.79	10.20	18.07	42.98
Region													
Midwest	97.3%	4.016	0.07	0	0.79	1.17	1.90	2.92	4.69	7.80	11.04	20.36	31.93
Northeast	%9′.26	4.255	0.079	0	0.78	1.26	2.03	3.19	5.37	8.44	11.61	17.73	42.98
South	94.9%	3.943	0.052	0	0.71	1.10	1.83	3.06	4.89	8.13	10.20	16.42	40.07
West	67 2%	4 116	0.079	_	080	1 13	1 09	2 13	5 03	7 08	10.00	10 50	00 20

Includes breads; sweetsuch as cakes, pie, and pastries; snack and breakfast foods made with grains; pasta; cooked ready-to-eat, and baby cereals, rice and grain mixtures.
 Note: SE = Standard error
 P = Percentile of the distribution
 Source: Based on EPA's analysis of the 1989/91 CSFII.



			Tabl	Table 17-2.	Intake o	Intake of Breads (g/kg-day) ^a	g/kg-day)	a					
Population Group	Percent Consuming	MEAN	SE	P1	P5	P10	P25	P50	P75	P90	P95	P99	P100
Total	91.6%	1.133	0.010	0	0	0.19	0.48	06.0	1.50	2.31	3.04	4.67	12.99
Age													
< 01	20.9%	1.072	0.102	0	0	0	0	0.34	1.65	3.29	4.06	60.9	12.99
1-2	88.9%	2.611	0.089	0	0	0.44	1.17	2.39	3.86	4.68	5.42	8.23	10.29
3-5	91.9%	2.217	0.063	0	0	0.44	1.19	2.03	3.04	4.01	5.14	6.95	12.35
6-11	93.4%	1.668	0.037	0	0	0.40	0.88	1.44	2.18	3.16	3.98	5.95	9.17
12-19	91.8%	1.068	0.025	0	0	0.21	0.45	0.91	1.46	2.15	2.78	3.43	7.44
20-39	92.9%	0.936	0.012	0	0	0.18	0.43	0.81	1.27	1.81	2.27	3.41	7.04
40-69	93.7%	0.915	0.011	0	0	0.20	0.46	0.81	1.25	1.77	2.08	2.83	11.16
+ 02	95.1%	0.976	0.021	0	0.15	0.29	0.56	0.87	1.31	1.76	2.15	2.76	11.81
Season													
Fall	91.3%	1.181	0.020	0	0	0.17	0.50	0.94	1.57	2.45	3.16	5.27	11.81
Spring	91.4%	1.095	0.018	0	0	0.18	0.48	0.89	1.45	2.18	2.91	4.54	12.35
Summer	92.4%	1.126	0.018	0	0	0.21	0.48	06.0	1.51	2.24	2.98	4.43	9.17
Winter	91.2%	1.129	0.019	0	0	0.19	0.47	0.89	1.50	2.37	3.07	4.66	12.99
Urbanization													
Central City	91.2%	1.127	0.017	0	0	0.18	0.49	0.91	1.50	2.33	2.98	4.50	11.81
Nonmetropolitan	91.7%	1.184	0.020	0	0	0.18	0.48	0.93	1.54	2.51	3.24	4.97	12.99
Suburban	91.8%	1.113	0.014	0	0	0.19	0.49	0.89	1.49	2.20	2.89	4.68	12.35
Race													
Asian	78.5%	0.981	0.078	0	0	0	0.34	98.0	1.51	2.57	2.61	3.34	3.34
Black	88.8%	1.159	0.030	0	0	0.11	0.37	0.84	1.55	2.59	3.29	5.58	8.94
Native American	81.3%	1.336	0.133	0	0	0.13	0.41	0.72	1.80	2.91	4.13	60.6	11.71
Other/NA	89.1%	1.333	0.067	0	0	0	0.62	1.11	1.70	2.66	3.79	6.16	9.98
White	92.5%	1.121	0.010	0	0	0.20	0.51	0.91	1.48	2.23	2.95	4.51	12.99
Region													
Midwest	91.2%	1.109	0.018	0	0	0.20	0.50	0.90	1.49	2.22	2.91	4.43	7.97
Northeast	91.1%	1.104	0.021	0	0	0.18	0.51	06.0	1.48	2.26	2.83	4.50	86.6
South	91.8%	1.155	0.017	0	0	0.18	0.46	0.92	1.54	2.41	3.13	4.89	12.99
West	92.1%	1.153	0.022	0	0	0.19	0.49	0.91	1.48	2.35	3.12	5.14	12.35
a Includes breads, rolls, muffins, bagels, biscuits, cornbread, and tortillas.	lls, muffins, bage	ds, biscuits,	cornbread	, and to	rtillas.								
Note: $SE = Standard$ P - Parcentile	SE = Standard error P = Parcentile of the distribution	5											
Source: Based on EPA	PA's analysis of the 1989/91 CSFII	ıı ء 1989/91 C	SFII										
Domice: Page a cr.	1 3 data you co	100001											



Todal SE P1 P5 P10 P25 P50 P75 P90 P95 P90 P10 Todal SO28 0.01 0.08 0.01 0.0 0.01 0.1 1.0 0.01 0.02 0.01 0.02						Table 17-3.	3. Intake o	Intake of Sweets (g/kg-day)	g/kg-day) ^a					
50.2% 0.50% 0.011 0 0 0 0 0 0.13 0.11 1.50 2.12 3.96 4.96% 1.144 0.1111 0 0 0 0 0 0 0.43 1.75 3.32 4.87 6.51 5.92% 1.139 0.079 0 0 0 0 0 0 0 0.43 1.75 3.32 4.87 6.51 4.50% 0.581 0.046 0 0 0 0 0 0 0.22 1.82 3.01 4.33 6.78 6.35 4.50% 0.581 0.046 0 0 0 0 0 0 0 0 0.25 1.24 1.99 3.39 4.50% 0.581 0.046 0 0 0 0 0 0 0 0 0	Population Group	Percent Consuming	MEAN	SE	P1	P5	P10	P25	P50	P75	P90	P95	66d	P100
1.5 1.5	Total	50.2%	0.508	0.011	0	0	0	0	0.13	0.71	1.50	2.12	3.96	13.39
St. Weight St.	Age													
49.6% 1.144 0.111 0 0 0 0 0.43 1.75 3.32 4.87 6.51 59.2% 1.139 0.079 0 0 0 0 0 0 0.45 1.75 3.32 4.87 6.51 54.0% 0.881 0.046 0 0 0 0 0 0 0 0 0	< 01	28.1%	0.447	960.0	0	0	0	0	0	0.41	1.42	2.26	5.51	9.35
Signature Sign	1-2	49.6%	1.144	0.111	0	0	0	0	0.43	1.75	3.32	4.87	6.51	13.39
6.57% 6.881 0.046 0 0 0 0 0.43 1.29 2.33 3.28 5.39 5.40% 0.581 0.036 0 0 0 0 0 0.22 0.75 1.47 1.99 3.25 4.51% 0.581 0.015 0 0 0 0 0 0 0 0.59 1.24 1.66 2.48 5.53% 0.444 0.029 0 0 0 0 0 0 0 0 0.59 1.24 1.66 2.48 5.23% 0.444 0.029 0 0 0 0 0 0 0 0 0	3-5	59.2%	1.139	0.079	0	0	0	0	0.56	1.82	3.01	4.33	6.78	9.25
54.0% 0.511 0.036 0 0 0 0 0.22 0.75 1.47 1.99 3.25 45.0% 0.383 0.015 0 0 0 0 0 0 0 0 0	6-11	63.7%	0.881	0.046	0	0	0	0	0.43	1.29	2.33	3.28	5.39	12.97
45.0% 0.383 0.015 0 0 0 0 0 0 0 0 0	12-19	54.0%	0.511	0.030	0	0	0	0	0.22	0.75	1.47	1.99	3.25	9.65
49.1% 6.381 6.015 6 0 0 0 0 0 0.06 6.55 1.13 1.58 2.70 52.9% 6.444 6.029 0 0 0 0 0 0 0.14 6.65 1.29 1.64 2.73 48.3% 6.466 6.021 0 0 0 0 0 0 0.14 6.65 1.35 1.29 1.64 2.73 48.5% 6.245 0.022 0 0 0 0 0 0 0.19 0.15 1.50 2.20 3.88 51.2% 6.466 0.021 0 0 0 0 0 0 0.19 0.71 1.50 2.00 4.00 61.3% 6.456 0.022 0 0 0 0 0 0 0.19 0.71 1.50 2.00 4.00 61.3% 6.475 0.025 0 0 0 0 0 0 0 0.25 0.82 1.58 2.44 4.25 74.5% 6.475 0.015 0 0 0 0 0 0 0 0 0.46 1.20 1.71 3.51 74.5% 6.245 0.025 0 0 0 0 0 0 0 0 0.33 1.47 1.48 2.44 74.5% 6.537 0.025 0 0 0 0 0 0 0 0.17 0.75 1.55 2.17 4.09 84.5% 6.537 0.026 0 0 0 0 0 0 0.22 0.33 1.47 1.48 2.44 85.59% 6.587 0.028 0 0 0 0 0 0 0 0.17 0.79 1.65 2.17 4.09 84.5% 6.549% 0.557 0.012 0 0 0 0 0 0 0.17 0.79 1.65 2.17 4.09 84.5% 6.549% 0.548 0.028 0 0 0 0 0 0 0 0.17 0.79 1.65 2.17 4.09 84.5% 6.549% 0.548 0.028 0 0 0 0 0 0 0.17 0.79 1.65 2.17 4.09 84.5% 6.549% 0.548 0.028 0 0 0 0 0 0 0 0.17 0.79 1.65 2.17 4.09 84.5% 6.549% 0.548 0.028 0 0 0 0 0 0 0.17 0.79 1.65 2.17 4.09 84.5% 6.549% 0.548 0.028 0 0 0 0 0 0 0.17 0.79 1.65 1.98 3.89 84.5% 6.549% 0.548 0.028 0 0 0 0 0 0 0 0.55 1.39 1.98 3.89 84.5% 6.549% 0.546 0.028 0.028 0.028 0.058 1.99 0.55 1.91 3.33 84.5% 6.549% 0.546 0.028 0.028 0.028 0.058 0.0	20-39	45.0%	0.383	0.015	0	0	0	0	0	0.59	1.24	1.66	2.48	7.45
56.3% 0.444 0.029 0 0 0.16 0.63 1.29 1.64 2.73 48.3% 0.456 0.022 0 0 0 0.14 0.76 1.55 1.29 1.64 2.73 48.3% 0.466 0.021 0 0 0 0.10 0.65 1.82 2.21 3.88 51.2% 0.583 0.022 0 0 0 0.10 0.65 1.85 2.21 3.58 City 45.3% 0.465 0.021 0 0 0 0.11 0.65 1.80 2.03 4.54 City 45.3% 0.495 0.021 0 0 0 0.11 0.71 1.50 2.02 4.04 City 45.3% 0.495 0.021 0 0 0 0.11 0.75 1.82 2.12 4.24 copolitan 52.3% 0.025 0 0 0 0 0.12 <t< td=""><td>40-69</td><td>49.1%</td><td>0.381</td><td>0.015</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0.08</td><td>0.55</td><td>1.13</td><td>1.58</td><td>2.70</td><td>5.70</td></t<>	40-69	49.1%	0.381	0.015	0	0	0	0	0.08	0.55	1.13	1.58	2.70	5.70
52.9% 0.533 0.022 0 0 0 0.14 0.76 1.55 2.21 3.82 action 48.3% 0.466 0.021 0 0 0 0.14 0.76 1.55 2.21 3.82 action 51.2% 0.566 0.021 0 0 0 0 0.10 0.55 1.36 2.35 4.54 City 0.508 0.022 0 0 0 0 0.19 0.71 1.50 2.35 4.54 City 0.508 0.022 0 0 0 0.11 0.65 1.55 2.12 3.54 City 0.47 0.015 0 0 0 0.11 0.65 1.42 2.00 4.04 City 0.477 0.015 0 0 0 0.01 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02	70 +	56.3%	0.444	0.029	0	0	0	0	0.16	0.63	1.29	1.64	2.73	6.94
48.3% 0.533 0.022 0 0 0 0.14 0.76 1.55 2.21 3.82 48.3% 0.466 0.021 0 0 0 0.10 0.65 1.36 1.82 3.82 auton 48.3% 0.466 0.021 0 0 0 0.10 0.65 1.36 1.82 3.88 city 45.3% 0.527 0.022 0 0 0 0.11 0.65 1.36 1.82 3.58 City 45.3% 0.495 0.021 0 0 0 0.11 0.65 1.50 2.02 4.04 city 45.3% 0.495 0.021 0 0 0.11 0.65 1.53 2.34 4.24 ropolitan 5.2.4% 0.475 0.015 0 0 0.12 0.25 0.25 0.24 4.24 ropolitan 5.2.4% 0.45 0.101 0 0 0 0.12 </td <td>Season</td> <td></td>	Season													
48.3% 0.466 0.021 0 0 0 0.10 0.65 1.36 1.82 3.58 action 48.5% 0.527 0.025 0 0 0 0.06 0.70 2.35 4.54 City 51.2% 0.508 0.025 0 0 0 0 0.11 0.65 1.55 2.12 4.54 City 45.3% 0.495 0.021 0 0 0 0.11 0.65 1.55 2.12 4.54 City 6.3% 0.495 0.021 0 0 0 0.11 0.65 1.55 2.12 4.54 City 0.453 0.475 0.015 0 0 0 0.17 0.69 1.42 2.00 3.54 American 33.5% 0.325 0.010 0 0 0 0 0.69 1.42 2.00 3.54 A 3.23% 0.235 0.035 0	Fall	52.9%	0.533	0.022	0	0	0	0	0.14	0.76	1.55	2.21	3.82	13.39
- 48.5% 0.527 0.025 0 0 0 0.06 0.70 2.35 4.54 action s1.2% 0.508 0.022 0 0 0 0.19 0.71 1.50 2.00 4.54 City 45.3% 0.58 0.022 0 0 0 0.11 0.65 1.55 2.12 4.54 City 45.3% 0.693 0.025 0 0 0 0.25 0.82 1.58 2.34 4.52 no 52.4% 0.477 0.015 0 0 0 0.25 0.82 1.58 2.34 4.52 no 52.4% 0.477 0.015 0 0 0 0.17 0.69 1.42 2.00 3.55 A 3.5.4% 0.477 0.101 0 0 0 0 0 0.17 0.78 1.45 2.44 A 3.2.3% 0.325 0.035 0 0	Spring	48.3%	0.466	0.021	0	0	0	0	0.10	0.65	1.36	1.82	3.58	9.35
action 51.2% 0.508 0.022 0 0 0 0 0.19 0.71 1.50 2.00 4.00 City 45.3% 0.495 0.021 0 0 0 0.11 0.65 1.55 2.12 4.24 ropolitan 52.3% 0.477 0.015 0 0 0 0.25 0.82 1.58 2.34 4.24 nn 52.4% 0.477 0.015 0 0 0 0.25 0.82 1.58 2.34 4.24 nn 52.4% 0.477 0.015 0 0 0 0.12 0.69 1.42 2.04 4.24 American 35.2% 0.387 0.001 0 0 0 0.46 1.22 2.22 2.24 American 3.9% 0.325 0.075 0 0 0 0 0 0 0 2.22 2.24 4.09 A 3.2.3% 0.	Summer	48.5%	0.527	0.025	0	0	0	0	90.0	0.70		2.35	4.54	8.73
ation City 45.3% 0.495 0.021 0 0 0.11 0.65 1.55 2.12 4.24 ropolitan 52.4% 0.495 0.025 0 0 0 0.25 0.82 1.58 2.34 4.52 n 52.4% 0.477 0.015 0 0 0 0.25 0.82 1.58 2.34 4.52 n 52.4% 0.477 0.015 0 0 0 0.25 0.82 1.42 2.04 4.52 n 52.4% 0.477 0.015 0 0 0 0.05 0.78 1.42 2.24 4.24 n 0.33 0.387 0.030 0 0 0 0.04 0 0 0.46 1.79 1.48 2.44 A 3.3.4% 0.283 0.078 0 0 0 0 0.46 1.20 1.71 3.24 i 3.3.	Winter	51.2%	0.508	0.022	0	0	0	0	0.19	0.71	1.50	2.00	4.00	10.84
City 45.3% 0.495 0.021 0 0 0 0.11 0.65 1.55 2.12 4.24 ropolitan 52.3% 0.593 0.025 0 0 0 0 0.25 0.82 1.58 2.34 4.52 n 52.4% 0.477 0.015 0 0 0 0 0.25 0.82 1.42 2.04 4.52 n 52.4% 0.477 0.015 0 0 0 0 0.14 0.69 1.42 2.04 4.52 n 33.3% 0.537 0.0101 0	Urbanization													
ropolitan 52.3% 0.593 0.025 0 0 0 0.25 0.82 1.58 2.34 4.52 n 52.4% 0.477 0.015 0 0 0 0 0.10 0.69 1.42 2.34 4.52 n 52.4% 0.477 0.015 0 0 0 0.10 0.25 1.42 2.00 3.55 37.6% 0.515 0.101 0 0 0 0 0.46 1.20 1.71 3.51 A 32.3% 0.325 0.075 0 0 0 0 0 0.46 1.20 1.71 3.51 A 32.3% 0.283 0.088 0 0 0 0 0.21 0.64 1.45 3.04 S 3.2.3% 0.537 0.012 0 0 0 0 0.77 1.55 2.17 4.09 S 55.9% 0.575 0.018 0	Central City	45.3%	0.495	0.021	0	0	0	0	0.11	0.65	1.55	2.12	4.24	9.94
n 52.4% 0.477 0.015 0 0 0 0 0.10 0 0.10 0 0.10 0 0.10 0 0.25 0.78 1.42 2.00 3.55 wmerican 39.3% 0.515 0.101 0 0 0 0 0.46 1.20 1.71 3.51 A 32.3% 0.387 0.075 0 0 0 0 0.46 1.20 1.71 3.51 A 32.3% 0.283 0.075 0 0 0 0 0.21 0.64 1.45 3.04 A 32.3% 0.283 0.088 0 0 0 0 0.21 0.64 1.45 3.04 S 53.2% 0.537 0.012 0 0 0 0.17 0.77 1.55 2.17 4.09 st 55.9% 0.587 0.024 0 0 0 0.09 0.05 0	Nonmetropolitan	52.3%	0.593	0.025	0	0	0	0	0.25	0.82	1.58	2.34	4.52	13.39
37.6% 0.515 0.101 0 0 0.05 0.78 1.82 2.22 2.52 sy.3% 0.387 0.030 0 0 0 0 0.46 1.20 1.71 3.51 A 32.3% 0.325 0.075 0 0 0 0 0.46 1.20 1.71 3.51 A 32.3% 0.283 0.075 0 0 0 0 0.64 1.45 3.04 A 32.3% 0.283 0.088 0 0 0 0.017 0.77 1.55 2.17 4.09 I 53.2% 0.573 0.012 0 0 0 0.17 0.79 1.65 2.11 4.00 st 55.9% 0.587 0.024 0 0 0 0.17 0.79 1.63 2.21 4.60 45.7% 0.416 0.018 0 0 0 0 0 0 0	Suburban	52.4%	0.477	0.015	0	0	0	0	0.10	69.0	1.42	2.00	3.55	9.65
37.6% 0.515 0.101 0 0 0 0.05 0.78 1.82 2.22 2.52 39.3% 0.387 0.030 0 0 0 0.46 1.20 1.71 3.51 A 32.3% 0.325 0.075 0 0 0 0 0.46 1.20 1.71 3.51 A 32.3% 0.283 0.088 0 0 0 0 0.44 1.45 1.48 2.44 I 53.2% 0.537 0.012 0 0 0 0.77 1.55 2.17 4.09 I 53.2% 0.573 0.024 0 0 0 0.17 0.77 1.55 2.17 4.09 st 55.9% 0.587 0.027 0 0 0 0.17 0.79 1.63 2.21 4.60 45.7% 0.416 0.018 0 0 0 0.09 0 0 0	Race													
39.3% 0.387 0.030 0 0 0 0 0.46 1.20 1.71 3.51 A 32.3% 0.325 0.075 0 0 0 0 0.33 1.47 1.48 2.44 A 32.3% 0.283 0.088 0 0 0 0 0.64 1.45 3.04 i 53.2% 0.537 0.012 0 0 0 0.77 1.55 2.17 4.09 st 55.9% 0.573 0.024 0 0 0 0.17 0.79 1.65 2.41 4.00 st 55.9% 0.587 0.027 0 0 0 0.17 0.79 1.65 2.21 4.60 45.7% 0.416 0.018 0 0 0 0.09 0.65 1.39 1.98 3.89 55 0.416 0.022 0 0 0 0 0.55 1.25 1.91 <td>Asian</td> <td>37.6%</td> <td>0.515</td> <td>0.101</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0.05</td> <td>0.78</td> <td>1.82</td> <td>2.22</td> <td>2.52</td> <td>4.06</td>	Asian	37.6%	0.515	0.101	0	0	0	0	0.05	0.78	1.82	2.22	2.52	4.06
A 33.9% 0.245 0.075 0 0 0 0 0.33 1.47 1.48 2.44 A 32.3% 0.283 0.088 0 0 0 0 0.21 0.64 1.45 3.04 t 53.2% 0.537 0.012 0 0 0 0 0.77 1.55 2.17 4.09 st 55.9% 0.573 0.024 0 0 0 0.17 0.79 1.65 2.41 4.00 st 55.9% 0.587 0.027 0 0 0 0.72 0.83 1.63 2.21 4.60 47.5% 0.411 0.018 0 0 0 0.09 0.65 1.39 1.98 3.89 46.7% 0.416 0.022 0 0 0 0 0.55 1.25 1.91 3.33	Black	39.3%	0.387	0.030	0	0	0	0	0	0.46	1.20	1.71	3.51	6.67
A 32.3% 0.283 0.088 0 0 0 0 0 0.21 0.64 1.45 3.04 5.04 5.2.% 0.537 0.012 0 0 0 0 0 0.17 0.77 1.55 2.17 4.09 1.0 53.0% 0.573 0.024 0 0 0 0 0 0.17 0.79 1.65 2.41 4.00 4.75% 0.416 0.022 0 0 0 0 0 0.09 0.65 1.39 1.98 3.89 4.67% 0.416 0.022 0 0 0 0 0 0 0.55 1.25 1.91 3.33	Native American	33.9%	0.325	0.075	0	0	0	0	0	0.33	1.47	1.48	2.4	3.78
53.2% 0.537 0.012 0 0 0 0 0.17 0.77 1.55 2.17 4.09 t 53.0% 0.573 0.024 0 0 0 0 0.17 0.79 1.65 2.41 4.00 st 55.9% 0.587 0.027 0 0 0 0 0.22 0.83 1.63 2.21 4.60 47.5% 0.416 0.022 0 0 0 0 0 0.55 1.25 1.91 3.33	Other/NA	32.3%	0.283	0.088	0	0	0	0	0	0.21	0.64	1.45	3.04	9.94
1 53.0% 0.573 0.024 0 0 0 0 0.17 0.79 1.65 2.41 4.00 34 55.9% 0.587 0.027 0 0 0 0 0.22 0.83 1.63 2.21 4.60 47.5% 0.471 0.018 0 0 0 0 0.09 0.65 1.39 1.98 3.89 46.7% 0.416 0.022 0 0 0 0 0 0.55 1.25 1.91 3.33	White	53.2%	0.537	0.012	0	0	0	0	0.17	0.77	1.55	2.17	4.09	13.39
east 53.0% 0.573 0.024 0 0 0 0 0.17 0.79 1.65 2.41 4.00 east 55.9% 0.587 0.027 0 0 0 0 0 0.22 0.83 1.63 2.21 4.60 47.5% 0.471 0.018 0 0 0 0 0 0.05 1.39 1.98 3.89 46.7% 0.416 0.022 0 0 0 0 0 0 0.55 1.25 1.91 3.33	Region													
east 55.9% 0.587 0.027 0 0 0 0.22 0.83 1.63 2.21 4.60 47.5% 0.471 0.018 0 0 0 0 0 0 0.65 1.39 1.98 3.89 46.7% 0.416 0.022 0 0 0 0 0 0.55 1.25 1.91 3.33	Midwest	53.0%	0.573	0.024	0	0	0	0	0.17	0.79	1.65	2.41	4.00	12.97
47.5% 0.471 0.018 0 0 0 0.09 0.65 1.39 1.98 3.89 46.7% 0.416 0.022 0 0 0 0 0.55 1.25 1.91 3.33	Northeast	92.9%	0.587	0.027	0	0	0	0	0.22	0.83	1.63	2.21	4.60	13.39
46.7% 0.416 0.022 0 0 0 0 0 0.55 1.25 1.91 3.33	South	47.5%	0.471	0.018	0	0	0	0	0.09	0.65	1.39	1.98	3.89	10.84
	West	46.7%	0.416	0.022	0	0	0	0	0	0.55	1.25	1.91	3.33	9.65

 $^{^{\}rm a}$ Includes cakes, cookies, pies, pastries, doughnuts, breakfast bars, and coffee cakes.

NOTE: SE = Standard error
P = Percentile of the distribution
Source: Based on EPA's analysis of the 1989/91 CSFIL



		Tak	Table 17-4. Intake of Snacks Containing Grain (g/kg-day)	take of Sn	acks Cor	ntaining	Grain (g		а				
Population Group	Percent Consuming	MEAN	SE	P1	P5	P10	P25	P50	P75	D64	P95	66d	P100
Total	40.3%	0.160	0.005	0	0	0	0	0	0.18	0.47	0.78	1.74	6.73
Age													
< 01	31.4%	0.321	0.064	0	0	0	0	0	0.35	1.24	1.82	4.66	5.73
1-2	46.7%	0.398	0.040	0	0	0	0	0.10	0.65	1.30	1.61	2.03	6.73
3-5	48.9%	0.393	0.034	0	0	0	0	0.12	0.58	1.22	1.65	2.20	4.76
6-11	43.1%	0.269	0.023	0	0	0	0	0	0.32	0.86	1.24	2.43	4.00
12-19	40.2%	0.170	0.016	0	0	0	0	0	0.21	0.50	0.74	1.94	3.51
20-39	38.2%	0.123	0.007	0	0	0	0	0	0.15	0.41	09.0	1.21	4.60
40-69	40.3%	0.104	0.006	0	0	0	0	0	0.14	0.33	0.46	1.06	2.85
70 +	40.9%	0.074	0.007	0	0	0	0	0	0.10	0.20	0.36	0.70	1.47
Season													
Fall	41.6%	0.180	0.012	0	0	0	0	0	0.18	0.50	0.87	1.99	6.73
Spring	38.3%	0.136	0.009	0	0	0	0	0	0.15	0.43	0.67	1.29	3.43
Summer	37.5%	0.165	0.010	0	0	0	0	0	0.18	0.52	0.86	1.72	5.73
Winter	43.9%	0.160	0.010	0	0	0	0	0	0.19	0.44	0.76	1.77	4.60
Urbanization													
Central City	36.5%	0.158	0.010	0	0	0	0	0	0.16	0.46	0.81	1.81	3.70
Nonmetropolitan	39.8%	0.144	0.00	0	0	0	0	0	0.17	0.44	99.0	1.32	4.76
Suburban	43.3%	0.169	0.008	0	0	0	0	0	0.18	0.50	0.80	1.75	6.73
Race													
Asian	22.1%	0.077	0.035	0	0	0	0	0	0.04	0.27	0.37	1.09	1.34
Black	25.9%	0.107	0.014	0	0	0	0	0	0.07	0.33	0.59	1.19	4.76
Native American	30.4%	0.142	0.050	0	0	0	0	0	0.16	0.32	0.44	1.29	4.60
Other/NA	28.3%	0.139	0.026	0	0	0	0	0	0.17	0.43	69.0	1.27	1.91
White	43.7%	0.170	0.006	0	0	0	0	0	0.19	0.49	0.81	1.80	6.73
Region													
Midwest	45.2%	0.202	0.012	0	0	0	0	0	0.23	0.57	0.99	1.95	6.73
Northeast	35.8%	0.113	0.010	0	0	0	0	0	0.10	0.35	0.61	1.28	5.73
South	39.8%	0.162	0.008	0	0	0	0	0	0.19	0.46	0.80	1.63	4.76
West	39.4%	0.155	0.011	0	0	0	0	0	0.16	0.46	0.76	1.81	4.60
^a Includes grain snacks such as crackers, salty snacks, popcorn, and pretzels.	such as crackers,	salty snacks, I	oopcorn, and	pretzels.									
NOTE: SE = Standard error P = Percentile of th	E = Standard error P = Percentile of the distribution												
		1100											
Source: Based on EPA's analysis of the 1989/91 CSFII	s analysis of the 13	389/91 CSFII.											

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			Table 17-5.	5. Intake	Intake of Breakfast Foods (g/kg-day) ^a	ast Foods	g/kg-da	y) ^a					
Population Group	Percent Consuming	MEAN	SE	P1	P5	P10	P25	P50	P75	P90	P95	66d	P100
Total	15.0%	0.144	0.012	0	0	0	0	0	0	0.46	0.95	2.46	13.61
Age													
< 01	13.2%	0.255	0.108	0	0	0	0	0	0	0.57	2.08	3.82	5.72
1-2	20.9%	0.418	0.103	0	0	0	0	0	0.37	1.54	2.50	4.62	9.95
3-5	24.5%	0.446	0.078	0	0	0	0	0	0.56	1.63	2.33	3.92	11.90
6-11	25.0%	0.307	0.045	0	0	0	0	0	0.31	1.12	1.69	2.83	13.61
12-19	18.4%	0.193	0.038	0	0	0	0	0	0	0.65	1.16	3.06	5.38
20-39	13.2%	0.086	0.014	0	0	0	0	0	0	0.31	0.61	1.53	4.41
40-69	10.8%	0.063	0.011	0	0	0	0	0	0	0.23	0.51	0.95	2.98
+ 0.2	12.5%	0.096	0.025	0	0	0	0	0	0	0.41	0.65	1.37	3.09
Season													
Fall	15.1%	0.146	0.021	0	0	0	0	0	0	0.49	0.93	2.61	6.83
Spring	13.2%	0.120	0.023	0	0	0	0	0	0	0.34	0.71	2.32	6.23
Summer	14.8%	0.145	0.022	0	0	0	0	0	0	0.53	0.98	2.03	7.41
Winter	17.0%	0.168	0.027	0	0	0	0	0	0	0.55	1.04	2.94	13.61
Urbanization													
Central City	15.1%	0.142	0.021	0	0	0	0	0	0	0.42	0.93	2.61	7.17
Nonmetropolitan	13.3%	0.120	0.020	0	0	0	0	0	0	0.39	0.85	1.97	7.41
Suburban	15.9%	0.157	0.019	0	0	0	0	0	0	0.52	1.06	2.45	13.61
Race													
Asian	10.1%	0.076	0.060	0	0	0	0	0	0	0.24	0.61	1.04	1.46
Black	11.9%	0.114	0.032	0	0	0	0	0	0	0.20	0.78	2.46	7.41
Native American	18.7%	0.156	0.073	0	0	0	0	0	0.21	0.53	0.61	1.23	6.83
Other/NA	13.7%	0.079	0.037	0	0	0	0	0	0	0.40	0.43	1.40	2.33
White	15.6%	0.152	0.013	0	0	0	0	0	0	0.51	0.97	2.56	13.61
Region													
Midwest	14.7%	0.121	0.020	0	0	0	0	0	0	0.38	0.75	2.06	7.41
Northeast	15.2%	0.158	0.034	0	0	0	0	0	0	0.43	1.02	2.61	13.61
South	12.3%	0.130	0.019	0	0	0	0	0	0	0.42	0.92	2.33	4.59
West	19.7%	0.184	0.024	0	0	0	0	0	0	0.67	1.14	2.58	96.9
^a Includes breakfast foods made with		grains such as pancakes, waffles, and french toast.	ncakes, waffle	s, and fre	nch toast.								
NOTE: SE = Standard error P = Percentile of	Standard errorP = Percentile of the distribution	tion											
Source: Based on EPA's analysis of the 1989/91.	's analysis of the 1	989/91.											

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Age MEAN SE Age 13.6% 0.233 0.018 4ge 13.6% 0.233 0.018 4ge 13.6% 0.233 0.018 4ge 13.6% 0.172 0.018 5-12 14.0% 0.569 0.212 3-5 15.3% 0.543 0.142 6-11 15.9% 0.538 0.063 10-19 14.3% 0.194 0.047 20-39 15.2% 0.172 0.028 70+ 9.9% 0.172 0.028 Ad-69 12.5% 0.172 0.038 Season 11.6% 0.173 0.038 Spring 11.5% 0.193 0.038 Spring 11.4% 0.193 0.038 Spring 11.4% 0.171 0.032 Suburbanization 11.4% 0.171 0.034 Suburbanization 11.4% 0.171 0.034 Suburbanization 11.4%		P P P P P P P P P P P P P P P P P P P	P10 P25 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	P50 0 0 0 0 0 0 0 0 0	P75 0 0 0 0 0 0 0 0 0 0	0.90 0.00 1.72 2.19 1.47 0.77 0.96 0.62	1.60 1.18 5.14 3.37 2.35 1.47 1.57 1.32 0.76	3.67 3.79 6.68 6.51 3.43 3.36 2.67 1.57	24.01 6.43 24.01 7.72 7.72 7.24 7.17 10.20 2.62 2.62
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7.3% 0.172 14.0% 0.569 15.3% 0.543 15.9% 0.543 15.9% 0.338 14.3% 0.194 15.2% 0.232 12.5% 0.032 12.5% 0.032 12.5% 0.0172 9.9% 0.023 13.9% 0.251 12.9% 0.193 ropolitan 11.4% 0.171 an 15.4% 0.286 an 15.4% 0.286 the second of the s				00000000000	00000000000	0.00 1.72 2.19 1.47 0.77 0.96 0.62 0.03	1.18 5.14 3.37 2.35 1.47 1.57 1.32 0.76	3.79 6.68 6.51 3.43 3.36 2.83 2.67 1.57	6.43 24.01 7.72 7.72 7.24 7.17 10.20 2.62 24.01 9.47
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14.0% 0.509 15.3% 0.543 15.9% 0.338 14.3% 0.194 15.2% 0.232 12.5% 0.172 9.9% 0.083 13.9% 0.250 13.9% 0.251 12.9% 0.193 cration City 12.9% 0.197 rropolitan 11.4% 0.171 an 15.4% 0.286 14.8% 0.918 6.6% 0.138 14.8% 0.918 15.1% 0.243 it 12.8% 0.182 it 12.8% 0.182						2.19 1.47 0.77 0.96 0.03	3.37 2.35 1.47 1.57 0.76	0.00 0.51 3.43 3.36 2.67 1.57	24.01 7.72 7.72 7.24 7.17 10.20 2.62 24.01 9.47
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14.0% 0.239 13.9% 0.250 13.9% 0.251 12.9% 0.193 zation City 12.9% 0.197 tropolitan 11.4% 0.171 an 15.4% 0.286 18.8% 0.918 6.6% 0.138 1A 8.6% 0.115 it 12.8% 0.182 st 21.9% 0.367		0 0 0 0	0 0 0 0	0 0 0	0 0	0.94	1 72	3.77	24.01
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ation City 12.9% 0.193 City 12.9% 0.197 ropolitan 11.4% 0.171 n 15.4% 0.286 18.8% 0.918 6.6% 0.138 A 8.6% 0.115 t 12.8% 0.182 st 21.9% 0.367		•	<		0	0.97	1.72	3.80	11.12
ation City 12.9% 0.197 ropolitan 11.4% 0.171 n 15.4% 0.286 18.8% 0.918 6.6% 0.138 A 8.6% 0.115 t 15.1% 0.243 t 12.8% 0.182 st 21.9% 0.367	0	0	>	0	0	0.68	1.33	3.22	8.73
City 12.9% 0.197 ropolitan 11.4% 0.171 n 15.4% 0.286 18.8% 0.918 6.6% 0.138 A 8.6% 0.115 t 12.8% 0.182 st 21.9% 0.367									
n 11.4% 0.171 n 15.4% 0.286 18.8% 0.918 6.6% 0.138 A 8.6% 0.115 t 12.1% 0.243 t 12.8% 0.182 st 21.9% 0.367	0	0	0	0	0	0.65	1.34	3.43	24.01
n 15.4% 0.286 18.8% 0.918 6.6% 0.138 A 8.6% 0.115 t 12.8% 0.182 st 21.9% 0.367	0	0	0	0	0	0.63	1.33	2.48	11.12
18.8% 0.918 6.6% 0.138 A 8.6% 0.115 15.1% 0.243 t 12.8% 0.182 st 21.9% 0.367		0	0	0	0	1.12	1.96	3.92	10.20
18.8% 0.918 6.6% 0.138 A 8.6% 0.115 15.1% 0.243 t 12.8% 0.182 st 21.9% 0.367									
6.6% 0.138 A 8.6% 0.115 15.1% 0.243 t 12.8% 0.182 st 21.9% 0.367	0	0	0	0	0.70	3.80	5.78	6.51	10.20
A 8.6% 0.115 15.1% 0.243 t 12.8% 0.182 st 21.9% 0.367	0	0	0	0	0	0.00	1.08	3.27	5.14
t 12.8% 0.343 t 12.8% 0.182 st 21.9% 0.367	0	0	0	0	0	0.00	1.16	2.43	3.86
t 12.8% 0.182 st 21.9% 0.367	0	0	0	0	0	0.94	1.65	3.46	24.01
12.8% 0.182 21.9% 0.367									
21.9% 0.367		0	0	0	0	0.74	1.24	2.76	9.46
		0	0	0	0	1.47	2.14	4.62	24.01
South 9.2% 0.179 0.035	0	0 0	0	0	0	0.45	1.32	3.63	11.12
West 14.7% 0.252 0.038	0	0	0	0	0	1.07	1.63	3.25	10.20
NOTE: $SE = Standard$ error $P = Percentile$ of the distribution									
Source: Based on EPA's analysis of the 1989/91 CSFII.									



				Table	3 17-7. Int	Table 17-7. Intake of Cooked Cereals (g/kg-day)	ked Cereals	(g/kg-day)					
Populatio n Group	Percent Consuming	MEAN	SE	P1	P5	P10	P25	P50	P75	D6d	P95	66d	P100
Total	17.1%	0.441	0.035	0	0	0	0	0	0	1.37	2.79	8.18	28.63
Age													
< 01	17.9%	1.350	0.417	0	0	0	0	0	0	7.17	8.60	20.47	24.16
1-2	23.6%	1.783	0.365	0	0	0	0	0	1.39	7.00	9.41	14.84	28.63
3-5	21.2%	1.335	0.258	0	0	0	0	0	0	4.99	8.18	12.51	18.66
6-11	18.1%	0.669	0.142	0	0	0	0	0	0	2.32	4.49	10.76	16.42
12-19	11.0%	0.156	0.065	0	0	0	0	0	0	0	1.26	3.34	11.85
20-39	10.5%	0.166	0.040	0	0	0	0	0	0	0	1.33	3.33	13.18
40-69	18.3%	0.307	0.036	0	0	0	0	0	0	1.30	2.20	3.97	18.23
70 +	35.3%	0.782	0.079	0	0	0	0	0	1.08	2.71	3.80	7.37	10.03
Season													
Fall	21.2%	0.573	0.066	0	0	0	0	0	0	1.90	3.71	9.15	28.63
Spring	15.8%	0.439	0.082	0	0	0	0	0	0	1.07	2.29	12.28	21.84
Summer	12.1%	0.288	0.069	0	0	0	0	0	0	0.55	1.98	5.37	24.16
Winter	19.1%	0.463	0.062	0	0	0	0	0	0	1.57	3.12	7.00	24.34
Urbanization													
Central City	19.3%	0.523	0.068	0	0	0	0	0	0	1.52	3.27	10.03	28.63
Nonmetropolitan	1 20.0%	0.483	0.066	0	0	0	0	0	0	1.52	2.72	7.41	20.94
Suburban	13.9%	0.369	0.052	0	0	0	0	0	0	1.09	2.35	7.37	24.34
Race													
Black	30.3%	0.838	0.092	0	0	0	0	0	0.65	2.95	4.45	10.03	28.63
Native American	η 17.5%	0.372	0.196	0	0	0	0	0	0	2.15	2.99	4.80	5.73
Other/NA	12.6%	0.510	0.293	0	0	0	0	0	0	1.12	3.18	7.60	20.94
White	15.1%	0.382	0.039	0	0	0	0	0	0	1.11	2.32	7.38	24.34
Region													
Midwest	15.5%	0.507	0.083	0	0	0	0	0	0	1.39	3.01	10.32	21.85
Northeast	13.2%	0.395	0.093	0	0	0	0	0	0	1.00	2.73	7.02	24.34
South	21.4%	0.396	0.044	0	0	0	0	0	0	1.40	2.48	5.53	28.63
West	15.2%	0.483	0.086	0	0	0	0	0	0	1.45	3.12	9.41	16.47
NOTE: $SE = St_t$ $P = Pt_t$	$\begin{split} SE &= Standard \ error \\ P &= Percentile \ of \ the \ distribution \end{split}$	distribution											
,	:												
Source: Based on EPA's analysis of the 1989/91 CSFII	on EPA's analys.	1s of the 198.	9/9I CSFII.										

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Populatio n Percent Group Consuming Total 20.0%	MEAN	SE	DI	DS	D10	50 500 D10 50	DSO	57G	DOO	D05	D00	D100
		1	-	C	110	C71	150	C/1	1 30	661	177	0011
	0.357	0.022	0	0	0	0	0	0	1.26	2.15	4.85	17.59
< 01 11.8%	0.405	0.209	0	0	0	0	0	0	1.40	2.89	7.87	15.54
1-2 24.4%	0.811	0.192	0	0	0	0	0	0.36	3.36	4.52	9.81	17.59
3-5 25.0%	0.736	0.127	0	0	0	0	0	0.76	2.83	3.77	6.70	14.35
6-11 20.8%	0.504	0.090	0	0	0	0	0	0	1.71	3.33	7.86	13.39
12-19 20.1%	0.316	0.052	0	0	0	0	0	0	1.26	1.91	3.74	09.6
20-39 21.3%	0.341	0.037	0	0	0	0	0	0	1.20	1.90	5.02	12.69
40-69 19.6%	0.259	0.028	0	0	0	0	0	0	0.94	1.64	3.35	12.00
70 + 14.9%	0.229	0.050	0	0	0	0	0	0	0.81	1.73	3.12	7.97
Season												
Fall 18.8%	0.307	0.041	0	0	0	0	0	0	0.94	2.13	4.92	16.74
Spring 21.5%	0.395	0.046	0	0	0	0	0	0	1.34	2.47	5.05	15.54
Summer 19.3%	0.376	0.045	0	0	0	0	0	0	1.31	2.05	5.02	12.55
Winter 20.5%	0.350	0.041	0	0	0	0	0	0	1.37	2.09	4.17	17.59
Urbanization												
Central City 26.1%	0.449	0.039	0	0	0	0	0	0.18	1.51	2.51	5.54	16.74
Normetropolitan 15.9%	0.311	0.046	0	0	0	0	0	0	1.04	1.90	5.02	12.91
Suburban 18.3%	0.320	0.031	0	0	0	0	0	0	1.16	2.01	4.30	17.59
Race												
Asian 72.5%	2.353	0.316	0	0	0	0	1.32	2.83	6.20	10.39	15.06	17.59
Black 37.2%	0.603	0.048	0	0	0	0	0	0.87	2.08	2.93	5.16	12.91
Other/NA 37.7%	0.655	0.116	0	0	0	0	0	08.0	2.15	3.78	90.9	10.71
White 15.9%	0.281	0.023	0	0	0	0	0	0	0.94	1.79	4.30	15.54
Region												
Midwest 12.3%	0.207	0.046	0	0	0	0	0	0	0.62	1.25	3.59	13.39
Northeast 20.3%	0.378	0.050	0	0	0	0	0	0	1.45	2.15	4.65	16.74
South 25.2%	0.455	0.036	0	0	0	0	0	0	1.62	2.71	5.21	15.54
West 20.4%	0.349	0.045	0	0	0	0	0	0	1.25	1.84	4.52	17.59



				Table 17-9.		of Ready-t	to-Eat Cere	Intake of Ready-to-Eat Cereals (g/kg-day) ^a	y) ^a				
Population Group	Percent Consuming	MEAN	SE	P1	P5	P10	P25	P50	P75	P90	P95	P99	P100
Total	45.6%	0.306	0.007	0	0	0	0	0	0.42	0.92	1.37	2.61	7.12
Age													
< 01	38.9%	0.431	0.059	0	0	0	0	0	0.64	1.55	1.94	3.40	4.40
1-2	70.7%	0.954	0.057	0	0	0	0	0.74	1.46	2.28	2.89	4.77	6.47
3-5	77.3%	1.026	0.044	0	0	0	0.31	0.83	1.48	2.35	2.99	3.67	5.65
6-11	%0.69	0.631	0.025	0	0	0	0	0.45	0.92	1.55	1.97	3.12	7.12
12-19	50.8%	0.317	0.019	0	0	0	0	0.16	0.48	06.0	1.14	2.61	4.06
20-39	34.3%	0.174	0.010	0	0	0	0	0	0.23	0.61	0.88	1.51	5.11
40-69	37.1%	0.166	0.008	0	0	0	0	0	0.25	0.55	0.74	1.32	3.36
+ 02	52.4%	0.222	0.013	0	0	0	0	0.08	0.36	0.64	0.83	1.55	2.71
Season													
Fall	45.2%	0.293	0.014	0	0	0	0	0	0.40	0.94	1.42	2.38	7.12
Spring	45.6%	0.320	0.015	0	0	0	0	0	0.44	0.95	1.42	2.69	5.88
Summer	46.6%	0.330	0.016	0	0	0	0	0	0.45	0.99	1.42	2.82	5.65
Winter	44.8%	0.280	0.014	0	0	0	0	0	0.39	0.81	1.22	2.61	6.47
Urbanization													
Central City	46.6%	0.319	0.014	0	0	0	0	0	0.43	0.94	1.42	2.86	5.11
Nonmetropolitan	43.6%	0.283	0.014	0	0	0	0	0	0.38	0.85	1.33	2.52	7.12
Suburban	46.0%	0.307	0.011	0	0	0	0	0	0.44	0.93	1.36	2.46	6.47
Race													
Asian	33.6%	0.218	0.065	0	0	0	0	0	0.24	0.81	1.28	2.79	3.12
Black	41.1%	0.269	0.018	0	0	0	0	0	0.40	0.82	1.16	2.50	4.46
Native American	38.6%	0.298	0.078	0	0	0	0	0	0.32	0.76	1.23	3.26	4.40
Other/NA	42.9%	0.340	0.050	0	0	0	0	0	0.43	1.12	1.59	5.69	4.18
White	46.7%	0.311	0.008	0	0	0	0	0	0.42	0.94	1.39	2.61	7.12
Region													
Midwest	48.7%	0.328	0.015	0	0	0	0	0	0.47	0.98	1.37	2.55	7.12
Northeast	46.9%	0.286	0.017	0	0	0	0	0	0.38	0.89	1.33	2.70	6.47
South	41.4%	0.284	0.012	0	0	0	0	0	0.40	0.81	1.26	2.34	5.88
West	47.7%	0.336	0.016	0	0	0	0	0	0.46	1.05	1.47	2.84	5.11
^a Includes dry ready-to-eat corn, ric NOTE: SE = Standard error P - Porcontile of the di	ry ready-to-eat corn, rice, wheat, = Standard error D - Porcentile of the distribution	rice, wheat,	e, wheat, and bran cereals in the form of flakes, puffs, etc.	reals in the	form of	flakes, puf	fs, etc.						
Course: Based on EDA's analyseis of the 1080/01 CCEII	EDA's analysi	. of the 1080	/01 CCEII										
Source, Dasea on	EFA S allarys	S Or ure 1505	/31 COFII.										

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			Ta	ble 17-10.	Table 17-10. Intake of Baby Cereals(g/kg-day)	Baby Cere	eals(g/kg-d	ay)					
Population Group	Percent Consuming	MEAN	SE	P1	P5	P10	P25	P50	P75	P90	P95	P99	P100
Total	1.1%	0.037	0.051	0	0	0	0	0	0	0	0	0	22.57
Age ^a													
< 01	28.5%	1.205	0.280	0	0	0	0	0	0.64	4.59	6.94	16.99	22.57
Season													
Fall	1.1%	0.036	0.075	0	0	0	0	0	0	0	0	69.0	14.94
Spring	1.1%	0.059	0.138	0	0	0	0	0	0	0	0	0.13	16.99
Summer	1.0%	0.017	0.068	0	0	0	0	0	0	0	0	0	12.03
Winter	1.0%	0.035	0.107	0	0	0	0	0	0	0	0	0	22.57
Urbanization													
Central City	1.3%	0.048	0.088	0	0	0	0	0	0	0	0	1.05	22.57
Nonmetropolitan	%6.0	0.011	0.040	0	0	0	0	0	0	0	0	0	9.41
Suburban	1.0%	0.042	0.093	0	0	0	0	0	0	0	0	0	16.99
Race													
Asian	0.7%	0.017	0.137	0	0	0	0	0	0	0	0	1.10	1.10
Black	2.1%	0.092	0.151	0	0	0	0	0	0	0	0	4.59	22.57
Native American	1.2%	0.010	0.088	0	0	0	0	0	0	0	0	0	1.63
Other/NA	3.1%	0.050	0.133	0	0	0	0	0	0	0	0	2.94	13.42
White	%8.0	0.029	0.059	0	0	0	0	0	0	0	0	0	16.99
Region													
Midwest	1.1%	0.020	0.050	0	0	0	0	0	0	0	0	0	12.50
Northeast	1.0%	0.084	0.208	0	0	0	0	0	0	0	0	1.25	16.99
South	1.0%	0.016	0.060	0	0	0	0	0	0	0	0	0	22.57
West	1.1%	0.046	0.101	0	0	0	0	0	0	0	0	1.18	10.18
^a Data presented only for children less than 1 year of age. Available data for other age groups was based on a very small number of observations	for children less	than 1 year of	age. Availa	ble data fo	r other ago	groups w	as based o	n a very s	mall numb	er of obser	vations		
NOIE: SE = Standard error	ra error	1											
r = rerc	P = Fercentile of the distribution	ibution - 1000 (01 CS	1121										
Source: based on EPA's analysis of	A S analysis of the	the 1989/91 CSF11	FII.										

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Food category	% Indiv. using food in 3 days	eating o	onsumed per occasion g)	Qua	antity con	sumed per	Consumer	9	cified percer	ntiles (g)
		Average	Standard Deviation	5	25	50	75	90	95	99
Yeast Breads	93.7	46	26	21	25	44	50	75	100	140
Pancakes	8.3	113	85	27	54	81	146	219	282	438
Waffles	2.9	87	74	20	40	78	100	158	200	400
Tortillas	2.9	69	39	28	30	60	90	120	140	210
Cakes and Cupcakes	25.5	79	59	23	41	63	99	144	184	284
Cookies	30.8	32	30	7	14	26	40	60	84	144
Pies	11.9	129	60	57	97	120	150	195	236	360
Doughnuts	9.9	64	40	26	42	43	84	106	126	208
Crackers	26.2	22	21	6	12	15	24	42	57	113
Popcorn	5.6	19	22	5	9	15	18	36	45	108
Pretzels	2.2	29	28	3	12	21	36	57	85	160
Corn-based Salty Snacks	5.9	33	30	9	18	21	40	60	80	156
Pasta	11.4	153	108	35	70	140	210	280	320	560
Rice	18.5	147	91	41	88	165	175	263	350	438
Cooked Cereals	17.4	203	110	31	123	240	245	360	480	490
Ready-to-Eat Cereals	43.4	36	25	8	22	29	45	60	84	120

	Average Consumption		
Raw Agricultural Commodity ^a	(Grams/Kg Body Weight-Day)	Standard Error	
Oats	0.0825748	0.0026061	
Rice-rough	0.0030600	0.0004343	
Rice-milled	0.1552627	0.0083546	
Rye-rough	0.0000010		
Rye-germ	0.0002735	0.0000483	
Rye-flour	0.0040285	0.0002922	
Wheat-rough	0.1406118	0.0050410	
Wheat-germ	0.0008051	0.0000789	
Wheat-bran	0.0121575	0.0004864	
Wheat-flour	1.2572489	0.0127412	
Millet	0.0000216	0.0000104	



		Breads, Rolls,	Other Baked		Mixtures,
Group Age (years)	Total Grains	Biscuits	Goods	Cereals, Pasta	Mainly Grain ^b
Males and Females					
Under 1	42	4	5	30	3
1-2	158	27	24	44	63
3-5	181	46	37	54	45
6-8	206	53	56	60	38
Males					
9-11	238	67	56	51	64
12-14	288	76	80	57	74
15-18	303	91	77	53	82
19-22	253	84	53	64	52
23-34	256	82	60	40	74
35-50	234	82	58	44	50
51-64	229	78	57	48	46
65-74	235	71	60	69	35
75 and Over	196	70	50	58	19
Females					
9-11	214	58	59	44	53
12-14	235	57	61	45	72
15-18	196	57	43	41	55
19-22	161	44	36	33	48
23-34	163	49	38	32	44
35-50	161	49	37	32	43
51-64	155	52	40	36	27
65-74	175	57	42	47	29
75 and Over	178	54	44	58	22
Males and Females					
All Ages	204	62	49	44	49

^a Based on USDA Nationwide Food Consumption Survey (1977-1978) data for one day.

Table 17-1	14 - Mean Grai	n Intakes per Inc	dividual in a Day	y by Sex and A	ge (g/day)ª for 1	987-1988	
Group Age (years)	Total Grains	Yeast Breads and Rolls	Quick Breads, Pancakes, French Toast	Cakes, Cookies, Pastries, Pies	Crackers, Popcorn, Pretzels, Corn Chips	Cereals and Pastas	Mixtures, Mostly Grain ^b
Males and Females 5 and Under	167	30	8	22	4	52	51
Males 6-11 12-19 20 and Over	268 304 272	51 65 65	16 28 20	37 45 37	8 10 8	74 72 58	83 82 83
Females 6-11 12-19 20 and Over All Individuals	231 239 208 237	43 45 45 52	19 13 14 16	30 29 28 32	6 7 6 7	66 52 53 57	68 91 62 72

^a Based on USDA Nationwide Food Consumption Survey (1987 to 1988) data for one day.

Source: USDA, 1993a.

b Includes mixtures containing grain as the main ingredient. Source: USDA, 1980.

^b Includes mixtures containing grain as the main ingredient.



Age (years)	Breads	Cereals	Other Grains
All ages	147.3 <u>+</u> 1.4	29.9 <u>+</u> 1.3	22.9 <u>+</u> 1.7
Jnder 1	16.2 <u>+</u> 9.2	37.9 <u>+</u> 8.2	1.8 <u>+</u> 10.9
to 4	104.6 <u>+</u> 4.5	38.4 <u>+</u> 4.0	14.8 <u>+</u> 5.4
5 to 9	154.3 <u>+</u> 3.8	39.5 + 3.4	22.7 <u>+</u> 4.5
10 to 14	186.2 <u>+</u> 3.6	36.4 <u>+</u> 3.2	25.6 <u>+</u> 4.2
15 to 19	188.5 <u>+</u> 3.7	28.8 <u>+</u> 3.3	27.8 <u>+</u> 4.4
20 to 24	166.5 <u>+</u> 4.9	20.2 <u>+</u> 4.3	25.0 <u>+</u> 5.8
25 to 29	170.0 <u>+</u> 5.0	18.2 <u>+</u> 4.4	26.6 <u>+</u> 5.9
30 to 39	156.8 <u>+</u> 3.9	18.8 <u>+</u> 3.5	26.4 <u>+</u> 4.6
10 to 59	144.4 <u>+</u> 3.1	24.7 <u>+</u> 2.7	23.3 <u>+</u> 3.6
60 and over	122.1 <u>+</u> 3.4	42.5 <u>+</u> 3.0	19.3 <u>+</u> 4.0

Table 17-1	6. Mean and Standard Error for t	he Daily Intake of Grains,	by Region (grams/day as co	onsumed)
Region	Total Grains	Breads	Cereals	Other Grains
All Regions	200.0 <u>+</u> 3.0	147.3 <u>+</u> 1.4	29.9 <u>+</u> 1.3	22.9 <u>+</u> 1.7
Northeast	203.5 <u>+</u> 5.8	153.1 <u>+</u> 2.8	24.6 <u>+</u> 2.5	25.9 <u>+</u> 3.3
North Central	192.8 <u>+</u> 5.6	150.9 <u>+</u> 2.7	28.7 <u>+</u> 2.4	13.3 <u>+</u> 3.2
South	202.2 <u>+</u> 4.7	143.9 <u>+</u> 2.3	34.6 <u>+</u> 2.0	23.7 <u>+</u> 2.7
West	202.6 <u>+</u> 6.9	139.5 <u>+</u> 3.3	30.9 <u>+</u> 3.0	32.1 <u>+</u> 4.0

NOTE: Northeast = Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, and Pennsylvania.

North Central = Ohio, Illinois, Indiana, Wisconsin, Michigan, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas.

 $South = Maryland, \ Delaware, \ District \ of \ Columbia, \ Virginia, \ West \ Virginia, \ North \ Carolina, \ South \ Carolina, \ Georgia, \ Florida, \ Kentucky, \ Tennessee, \ Alabama, \ Mississippi, \ Arkansas, \ Louisiana, \ Texas, \ and \ Oklahoma.$

West = Montana, Idaho, Wyoming, Utah, Colorado, New Mexico, Arizona, Nevada, Washington, Oregon, and California.

Source: U.S. EPA, 1984b.



Table 17-17. Consumption of Grains (g dry weight/day) for Different Age Groups and Estimated Lifetime Average Daily Food Intakes for a US Citizen (averaged across sex) Calculated from the FDA Diet Data

	Age (in years)						Estimatedifetime
	(0-1)	(1-5)	(6-13)	(14-19)	(20-44)	(45-70)	
Wheat	27.60	42.23	60.80	79.36	65.86	55.13	60.30
Corn	4.00	15.35	19.28	23.21	17.83	14.82	17.01
Rice	2.22	4.58	5.24	5.89	5.78	4.21	5.03
Oats	3.73	2.65	2.27	1.89	1.32	2.00	1.85
Other Grain	0.01	0.08	0.41	0.73	13.45	4.41	6.49
Total Grain	37.56	64.82	87.58	110.34	90.59	76.17	84.19

 $^{^{\}rm a}$ The estimated lifetime dietary intakes were estimated by:

Estimated lifetime = IR(0-1) + 5yrs*IR(1-5) + 8 yrs*IR(6-13) + 6 yrs*IR(14-19) + 25 yrs*IR(20-44) + 25 yrs*IR(45-70)

where IR = the intake rate for a specific age group.

Source: U.S. EPA, 1989.

Table 17-18. Per Capita consumption of F	our and Cereal Products in 1991 ^a
Flour and Cereal I	Products
	Per Capita Consumption
Food Item	$(g/day)^a$
Total Wheat Flour ^b	169.8
Rye Flour	0.7
Rice ^c	20.9
Total Corn Products ^d	27.2
Oat Products ^e	10.7
Barley Products ^f	1.1
Total Flour and Cereal Products ^g	230.6

^a Original data were presented in lbs/yr; data were converted to g/day by multiplying by a factor of 454 g/lb and dividing by 365 days/yr. Consumption of most items at the processing level. Excludes quantities used in alcoholic beverages and fuel.

Source: USDA, 1993b.

b Includes white, whole wheat, and durum flour.

Milled basis.

Includes corn flour and meal, hominy and grits, and corn starch.

Includes rolled oats, ready-to-eat cereals, oat flour, and oat bran.

f Includes barley flour, pearl barley, and malt and malt extract used in food processing.

g Excludes wheat not ground into flour, for example, shredded wheat breakfast cereals.



	Ta	Table 17-19. Summary of Grain Intake Studies	tudies	
Study	Survey Population Used in Calculating Intake	Types of Data Used	Units	Food Items
KEY STUDIES				
EPA Analysis of 1989/91 CSFII Data	Per capita	1989/91 CSFII data; Based on 3-day average individual intake rates.	g/kg-day; as consumed	Distributions of intake rates for total grain; individual grain items
Pao et al., 1982	Consumers only serving size data provided	1977/78 NFCS 3-day individual intake data	g; as consumed	Distributions of serving sizes for grain products
RELEVANT STUDIES				
EPA's DRES (White et al., 1983)	Per capita (i.e., consumers and nonconsumers)	1977/78 NFCS 3-day individual intake data	g/kg-day; as consumed	Intake for a wide variety of grain products presented; complex food groups were disaggregated
USDA, 1980; 1993a	Per capita and consumer only grouped by age and sex	1977/78 and 1987/88 NFCS 1-day individual intake data	g/day; as consumed	Total grains and various grain products
USDA, 1993b	Per capita consumption based on "food disappearance"	Based on food supply and utilization data	g/day; as consumed	Intake rates of grain products
U.S. EPA/ORP, 1984a; 1984b	Per capita	1977/78 NFCS Individual intake data	g/day; as consumed	Mean intake rates for total grain products, and individual grain items.
U.S. EPA/OST, 1989	Estimated lifetime dietary intake	Based on FDA Total Diet Study Food List which used 1977/78 NFCS data, and NHANES II data	g/day; dry weight	Various food groups; complex foods disaggregated

Table 17-20.	Table 17-20. Summary of Recommended Values for Per Capita Intake of Grain Products and Serving Size	Per Capita Intake of Grain Products and	Serving Size
Mean	95th Percentile	Multiple Percentiles	Study
Total Grain Intake			
4.1 g/kg-day	10.8 g/kg-day	see Table 17-1	EPA Analysis of CSFII 1989-91 Data
Individual Grain Products			
see Tables 17-2 to 17-10	see Tables 17-2 to 17-10	see Table 17-2 to 17-10	EPA Analysis of CSFII 1989-91 Data
Serving Size			
see Table 17-11	see Table 17-11	see Table 17-11	Pao et al., 1982



Table 17-21.	Confidence in Grain Products Intake Recommendation	
Considerations	Rationale	Rating
Study Elements		
Level of peer review	USDA CSFII survey receives high level of peer review. EPA analysis of these data has not been peer reviewed outside the Agency. (Peer review will be conducted as part of the peer review of this Handbook)	Medium (This will become a "high" once the Handbook's peer review is completed)
 Accessibility 	CSFII data is publicly available	High
Reproducibility	Enough information is included to reproduce results	High
Focus on factor of interest	Analysis is specifically designed to address food intake	High
Data pertinent to U.S.	Data focuses on the U.S. population	High
Primary data	This is new analysis of primary data	High
• Currency	Is the most current data publicly available	High
Adequacy of data collection period	Survey is designed to collect short-term data.	Medium confidence for average values; Low confidence for long term percentile distribution
Validity of approach	Survey methodology was adequate	High
Study size	Study size was very large and therefore adequate	High
Representativeness of the population	The population studied was the U.S. population.	High
Characterization of variability	Survey was not designed to capture long term day-to- day variability. Short term distributions are provided for various age groups, regions, etc.	Medium
 Lack of bias in study design (high rating is desirable) 	Response rate was adequate?	Medium
Measurement error	No measurements were taken. The study relied on survey data.	N/A
Other Elements		
Number of studies	1 CSFII is the most recent data publicly available. Therefore, it was the only study classified as key study.	Low
Agreement between researchers	Although the CSFII was the only study classified as key study, the results are in good agreement with earlier data.	High
Overall Rating	The survey is representative of U.S. population; Although there was only one study considered key, these data are the most recent and are in agreement with earlier data; the approach used to analyzed the data was adequate. However, due to the limitations of the survey design estimation of long-term percentile values (especially the upper percentiles) is uncertain.	High confidence in the average; Low confidence in the long-term upper percentiles



	22. Confidence in Grain Serving Size Recommendations	
Considerations	Rationale	Rating
Study Elements		
• Level of peer review	USDA NFCS survey receives high level of peer review.	High
 Accessibility 	The NFCS data are publicly available	High
 Reproducibility 	Methodology is clearly explained	High
Focus on factor of interest	Analysis is specifically designed to address food intake	High
• Data pertinent to U.S.	Data focuses on the U.S. population	High
• Primary data	The study analyzed primary data	High
• Currency	The data are old (i.e. 1977-78)	Low
Adequacy of data collection period	Survey is designed to collect short-term data.	Medium
 Validity of approach 	Survey methodology was adequate	High
• Study size	Study size was very large and therefore adequate	High
• Representativeness of the population	The population studied was the U.S. population.	High
Characterization of variability	Survey was not designed to capture long term day- to-day variability. Short term distributions are provided	Medium
 Lack of bias in study design (high rating is desirable) 	Response rate was adequate	Medium
Measurement error	No measurements were taken. The study relied on survey data.	N/A
Other Elements		
• Number of studies	1	Low
Agreement between researchers	Although serving size data may have been collected in other surveys, they have not been reported in any other study.	Low
Overall Rating	The survey is representative of U.S. population; the approach used to analyzed the data was adequate. However, due to the limitations of the survey design estimation of long-term percentile values (especially the upper percentiles) is uncertain.	Medium



APPENDIX 17-A

FOOD CODES AND DEFINITIONS USED IN THE ANALYSIS OF THE 1989/91 USDA CSFII GRAINS DATA



Table 17A-1. Food Codes and Definitions Used in the Analysis of the 1989/91 USDA CSFII Grains Data						
Food Product	Food Codes and Descriptions		Food Product	Food Codes and Descriptions		
Total Grains	mixture: portion	breads tortillas sweets snacks breakfast foods pasta cooked cereals and rice ready-to-eat and baby cereals cludes the average portion of grain s (i.e., 31 percent) and the average of meat mixtures (i.e., 13 percent) b by grain.	Pasta	561-	macaroni noodles spaghetti	
Breads	51- 52-	breads rolls muffins bagel biscuits corn bread tortillas	Cooked Cereals	56200 56201 56202 56203 56206 56207 56208 56209	- - 9- -	includes grits, oatmeal, cornmeal mush, millet, etc.
Sweets	53-	cakes cookies pies pastries doughnuts breakfast bars coffee cakes	Rice	56204 56205 56206	5- rice	
Snacks	54-	crackers salty snacks popcorn pretzels	Ready-to-eat Cereals	570- 571- 572- 573- 574- 575- 576-	includes all varieties of ready-to-eat cereals	
Breakfast Foods	55-	pancakes waffles french toast	Baby Cereals	578-	baby cereals	
Grain Mixtures	58-	grain mixtures	Meat Mixtures	27- 28-	meat mixt	tures